

EVOLUTION OF SINGLE-PARTICLE STRUCTURE AND NUCLEAR FORCE

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The evolution of single-particle levels as N and/or Z change will be discussed with particular emphasis on exotic nuclei. The spin-isospin dependent nuclear forces play various indispensable roles in this shell evolution. Especially, the tensor force shifts single-particle energies in a specific way. It changes the spacing of spin-orbit partners even to the extent that the (sub-)magic structure can be destroyed. Its effects appear as large as those by the neutron skin. We can present several examples of disappearance of sub-shell gaps, for instance, $Z=14, 16, 28$, etc. Such changes can induce strong deformation because the nuclear collectivity is sensitive to the shell structure. The mechanism of the shell evolution by the tensor interaction can be understood in a simple picture. The shell evolution due to the $\sigma\sigma\tau\tau$ interaction within a major shell is discussed in relation to the shell evolution by the tensor interaction. The effect of the tensor interaction on energy spectra may be discussed as well.